REMARKS

Applicants request reconsideration of the subject application in light of the following remarks.

Claims 2 and 3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,566,289 to Iizuka et al. in view of U.S. Patent No. 5,952,757 to Boyd, Jr. Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to an apparatus for driving a compressor and to a refrigerating air conditioner. The apparatus for driving the compressor includes a compressor, an electric motor for driving the compression mechanism part of the compressor, and an inverter device for driving the electric motor at variable speeds. The refrigerating air conditioner of the present invention includes a compressor that comprises a compression mechanism part and an electric motor for driving the compression mechanism part, and a closed vessel receiving therein the compression mechanism part and electric motor. An inverter device is included for driving the compressor at various speeds.

According to the present invention, the electric motor comprises a self-starting type electric motor having a rotor, which comprises a cage conductor and a polarized permanent magnet. Switchover means are provided so as to change over operation of the electric motor either at constant speed with a commercial electric source or at variable speed with the inverter device.

The inverter device of the present invention does not necessarily need a current-phase controlling function. The electric motor operates as an induction motor owing to the action of the three-phase windings and the cage conductor until reaching a synchronous revolution from starting, and operates as a synchronous motor owing to the action of the three-phase windings and the permanent magnet

when reaching synchronous revolution. Therefore, matching of the current-phase control by the inverter device with the electric motor is unnecessary, so that the inverter device can be made simple while the compressor has reduced starting failures. Also, while the electric motor is operated in synchronous revolution, no secondary current is generated in the rotor, so that the electric motor can be operated efficiently and that slip is zero. Also, capacity control of the compressor 10 can be made by using the inverter device to change the number of synchronous revolutions.

That is, the electric motor of the invention operates as an induction motor owing to the action of the three-phase windings and the cage conductor until reaching a synchronous revolution from starting, and operates as a synchronous motor owing to the action of the three-phase windings and the permanent magnet when reaching the synchronous revolution, and capacity control of the compressor is effected by changing the number of synchronous revolutions by means of the inverter device.

This is not described in Iizuka et al and Boyd, Jr.

The patent to Iizuka et al. discloses a refrigerator control system comprising an inverter for driving a motor for the compressor, and change-over device for driving the compressor directly with a commercial power supply when the compressor motor is not driven by the inverter. As recognized by the Examiner, the patent to Iizuka et al. does not disclose the use of a self-starting type electric motor having a rotor which comprises a cage conductor and a polarized permit magnet. To the contrary, the Iizuka et al. patent discloses that the motor may be a single-phase induction motor. See, column 2, lines 44-45 of the Iizuka et al. There is no suggestion in

Iizuka et al. that the motor should be a self-starting type electric motor having a rotor which comprises a cage conductor and a polarized permit magnet.

The patent to Boyd, Jr. discloses an electric motor including a stator having a stator core, a start winding and first and second main windings. The motor also includes a rotor having a rotor shaft concentrically arranged axially of the stator core and a rotor core positioned concentrically with the rotor shaft. Secondary conductors are arranged axially of the rotor shaft and extend through the rotor core. A plurality of permanent magnetic are located at an outer periphery of the rotor core and are magnetized to form a number of poles equal to the number of poles formed by the second main winding. This patent discloses that such motors are typically utilized for applications such as furnace blower motors.

Since the Boyd, Jr. patent relates to a motor for driving a blower fan, not a compressor, the Boyd, Jr. patent represents non-analogous art. Moreover, at column 2, line 57 et. seq. of Boyd, Jr., this patent suggests that it is desirable and advantageous to provide a motor which does not require a supply voltage frequency controller to change the motor speed. This portion of Boyd, Jr. teaches away from using the motor of Boyd, Jr. in the refrigerator control system of Iizuka et al. with an inverter.

Accordingly, it is submitted there is no motivation in either Iizuka et al. or Boyd, Jr. to use the motor of Boyd, Jr. in the refrigerator control system of the Iizuka et al. While the Examiner alleges that it would have been obvious to do so "for the purpose of providing an electric motor that is easier to manufacture," the Examiner has not supported this allegation with any teaching in the prior art. Moreover, there is no reason to believe that the electric motor Boyd, Jr. is any easier to manufacture than a single-phase induction motor describe in Iizuka et al. Accordingly, there is

absolutely no motivation to combine the teachings of the Iizuka et al. and Boyd, Jr. patents in the manner urged by the Examiner.

Claims 6 and 7 stand rejected under 35 USC 103(a) as being unpatentable over Iizuka et al. in view of Boyd, Jr. and further in view of U.S. Patent No. 6,408,645 to Tsuboe et al. Applicants traverse this rejection and request reconsideration thereof.

The Tsuboe et al. discloses an air conditioner, outdoor unit and refrigeration unit. Figure 7 of this patent discloses an embedded magnet type synchronized motor, the rotor of which includes a rotor core in which permanent magnets are embedded, the permanent magnets being magnetized in the bi-polar state, and conductors embedded in the vicinity of the circumference of the rotor to form cage conductors (windings). At column 9, lines 38-44 of this patent, it is disclosed that the motor can be driven by using an inverter power source which can change its frequency.

The Tsuboe et al. patent, like Boyd, Jr., does not disclose switchover means structured so as to change over operation of the electric motor either constant speed with a commercial electric source or a variable speed with the inverter device. Moreover, it is submitted there is no motivation in any of Iizuka et al., Boyd, Jr. or Tsuboe et al. to substitute the motor of Tsuboe et al. for that of Iizuka et al. Accordingly, it is submitted that the presently claimed invention is present patentable over the proposed combination of references.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.43044X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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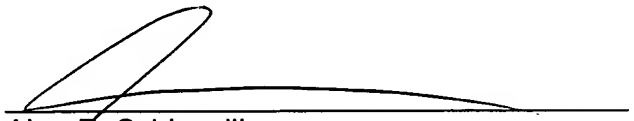

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